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FINAL STATEMENT OF BASIS

CLASS V INJECTION WELL AREA PERMIT
WINDY HILL GAS STORAGE, LLC
WINDY HILL GAS STORAGE PROJECT
MORGAN COUNTY, CO

EPA AREA PERMIT NO. CO51001-00000

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This STATEMENT OF BASIS gives the derivation of site-specific UIC Permit conditions and reasons for them. Referenced sections and conditions correspond to sections and conditions in the Permit.

UIC Permits specify the conditions and requirements for construction, operation, monitoring and reporting, and plugging of injection wells to prevent the movement of fluids into underground sources of drinking water (USDW). Under 40 CFR 144 Subpart D, certain conditions apply to all UIC Permits and may be incorporated either expressly or by reference. General Permit conditions for which content is mandatory and not subject to site-specific differences (40 CFR Parts 144, 146 and 147) are not discussed in this document.

Upon the Effective Date, the Permit authorizes the conversion and operation of a new injection well project governed by the conditions specified in the Permit. The Permit is issued for a period of ten years unless terminated for reasonable cause under 40 CFR 144.39, 144.40 and 144.41. The Permit is subject to EPA review at least once every five (5) years to determine if action is required under 40 CFR 144.36(a).

PART I. General Information and Description of Facility

Windy Hill Gas Storage, LLC
61 Wilton Road
Westport, CT 06880

on

June 14, 2005

submitted an application for an Underground Injection Control (UIC) Program Class I Area Permit for the following injection well Project:

Windy Hill Gas Storage Project
Location: S17, T3N, R55W, Morgan County, CO

Operational considerations required redefining the project as a Class V Area Permit.

Regulations specific to Class V injection well operations in the State of Colorado are found at 40 CFR 147 Subpart G.

The Permit application, including the required information and data necessary to issue a UIC Permit in accordance with 40 CFR Parts 124, 144, 146 and 147, was reviewed by EPA and determined to be complete.

These disposal wells would usually be classified as Class I non-hazardous industrial disposal wells. However, there are two formations that exist below the intended injection formation that could be Underground Sources of Drinking Water (USDWs). Since Class I wells are required to inject below all USDWs, this project has been classified as a Class V disposal well project.

The permitting standards for Class V wells allow for flexibility in assigning permit specific conditions. This permit for a Class V Area Permit was written in such a way as to conform to the standards usually applicable to stringently regulated Class I industrial injection well operations. If cited in this permit, any reference to permit conditions, regulation cites, or guidance documents intended specifically for other well types is hereby applicable to the wells covered by this Class V area Permit.

This Permit is issued for a time period of the (10) years and will expire after that time, or upon delegation of primary enforcement responsibility (primacy) for applicable portions of the UIC Program to the appropriate agency and that agency has the authority and chooses to adopt and enforce this Permit. If the permittee wishes to continue any activity regulated by this permit after the expiration date of this permit, the permittee must submit a complete application for a new permit at least 180 days before the permit expires.

This Area Permit includes the authorization for one well which is currently constructed (but not yet converted to injection status), and also authorizes three additional injection wells that may be constructed at a later date. TABLE 1.1 shows the location of the each of these injection wells:

TABLE 1.1 Injection Well Status and Location		
Well Name	UIC Well ID	Location
UWHGS 1-17D	CO06848	Drilled: 760' FNL, 656' FWL, S17, T3N, R55W, Morgan County, CO
UWHGS 2-17D	CO06849	Proposed: Center NE/4, NE/4, S17, T3N, R55W, Morgan County, CO
UWHGS 3-17D	CO06850	Proposed: Center SE/4, NE/4, S17, T3N, R55W, Morgan County, CO
UWHGS 4-17D	CO06851	Proposed: Center NE/4, SE/4, S17, T3N, R55W, Morgan County, CO

Background

The Windy Hill Gas Storage Project is a hydrocarbon gas storage facility proposed in Morgan County, Colorado, southeast of the town of Brush, Colorado. This facility proposes to store hydrocarbon gas inside of six caverns dissolved into the Permian age salt formations approximately 6000 feet below the land surface. Six cavern development wells will be used to inject low-salinity water into the salt beds, dissolving the salt to create caverns.

The dissolved salt solution will be pumped back to the surface and discharged into settling ponds. It will then be processed through a hydrocyclone to remove larger insolubles, then disposed into the Dakota J-4 Sandstone via the four Class V non-hazardous waste disposal wells permitted by EPA under this UIC Area Permit.

This permit specifies requirements for the construction, operation, monitoring, reporting and plugging of the four Class V non-hazardous waste disposal wells. The six cavern development wells will be regulated separately through the EPA Class III Area Permit CO31014-00000.

ENDANGERED SPECIES ACT CONSIDERATIONS

On May 19 and May 24, 2004, field reconnaissance was conducted to identify species and habitat present in the project area. The species and habitat identified and considered were the bald eagle, black-footed ferret, interior least tern, pallid sturgeon, piping plover, Preble's meadow jumping mouse Ute Ladie's-tresses orchid, and whooping crane, as listed on the FWS website, *Federally Listed and Proposed, Endangered, Threatened, Experimental, and Candidate Species and Habitat in Colorado By County.*

In a July 20, 2005, letter to the U.S. Fish and Wildlife Service (FWS) Field Supervisor, MFG, Inc., on behalf of Unocal, requested FWS concurrence on the determination that the Windy Hill Gas Storage Project would have No Effect on threatened, endangered, proposed, or candidate species, but a determination of No Effect does not require the concurrence of the FWS. The determination was based on the following findings: no appropriate habitat exists for any listed species in the project area; there are no large

prairie dog colonies to support black-footed ferret; the remainder of the species that may occur in Morgan County are water dependent and there is no surface water on or adjacent to the project area; no appropriate habitat or characteristics would draw bald eagles away from other water bodies for feeding, roosting or nesting opportunities; and, the potential for carrion to attract eagles to the site is relatively low.

NATIONAL HISTORIC PRESERVATION ACT CONSIDERATIONS

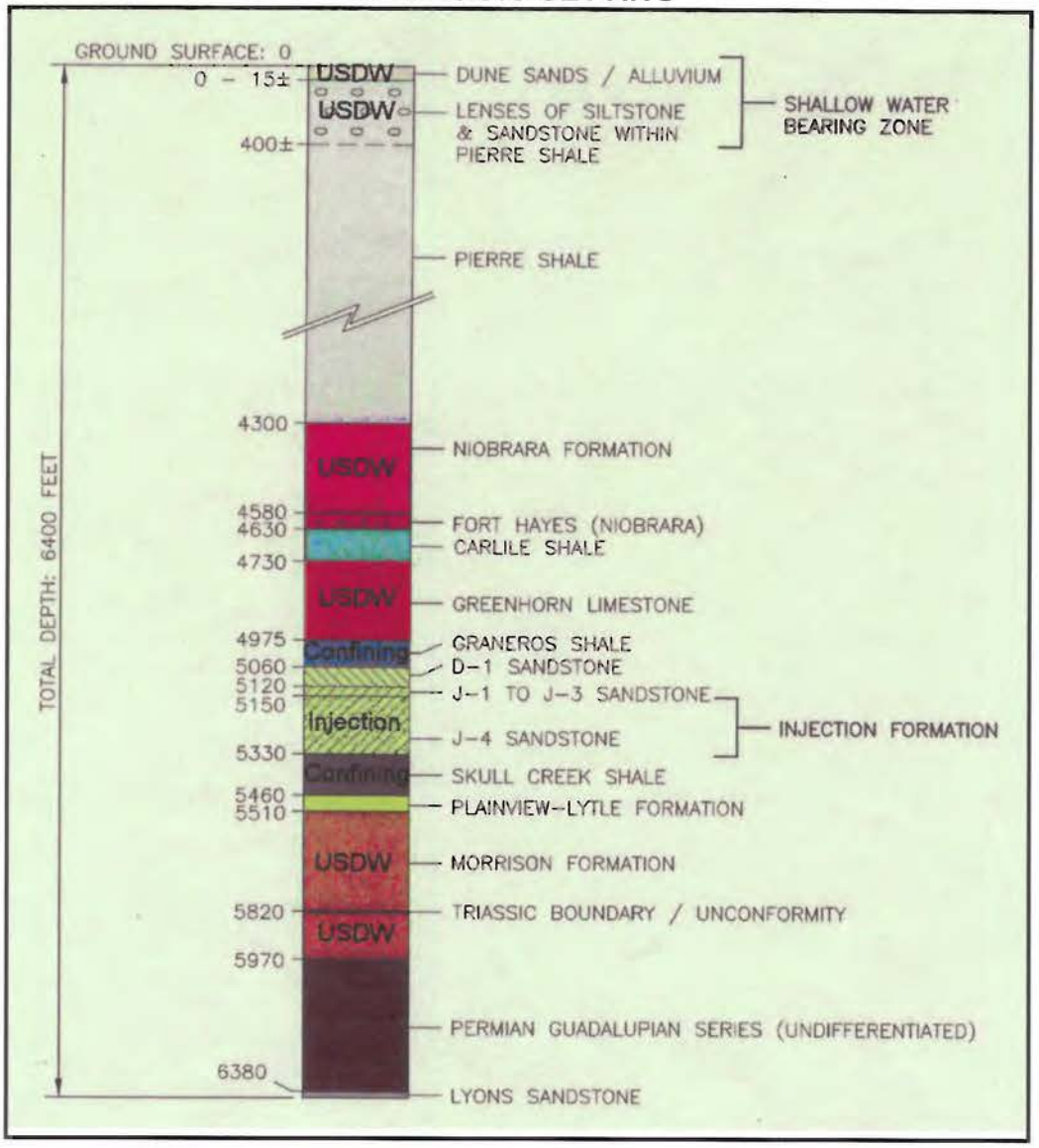
Section 106 of the National Historic Preservation Act (Section 106), as amended, requires that federal agencies, in consultation with the State Historic Preservation Officer (SHPO) , consider the effect of federally funded or permitted undertakings to cultural resources listed, or eligible for listing, in the National Register of Historic Places. A Class III cultural resource inventory of the project area was conducted in 2005 for licensing of this project under the Federal Energy Regulatory Commission. At the request of The operator and to assist the Federal Energy Regulatory Commission (FERC) in meeting the requirements of Section 106 and its implementing regulations, Greystone Environmental Consultants (Greystone) conducted an extensive pedestrian cultural resources inventory of approximately 1,172 acres for the area that may be affected by the construction and operation of the storage facility, and by the pipelines and utilities connecting to the storage facility. In a July 20, 2004 letter to the SHPO, Greystone stated that a single historic site (5MR817) was located and documented by this survey, recommended it to be not eligible for the National Register of Historic Places, and recommended no further cultural resource work. The SHPO concurred in a letter dated July 27, 2005, stating that "no historic properties will be affected by this project."

PART II. Permit Considerations (40 CFR 146.24)

REGIONAL GEOLOGY AND STRATIGRAPHY

The project area is located in the central portion of the east flank of the Denver Basin. The Denver Basin is asymmetrical, with the basin axis close to and parallel to the Front Range of the Rocky Mountains. The east flank of the basin dips west at ½ - 1 degree. The project area is located in an area of low seismicity and there are no regional faults in the area of review. The operator conducted seismic testing in January 2005, and confirmed that there are no fault displacements in the project area in the Dakota J Sandstone, the proposed brine disposal zone or the Permian salt (see Figure 2.1).

FIGURE 2.1
GEOLOGIC SETTING



DUNE SANDS/ALLUVIUM (0' - 15')

Exposed to the surface and situated on top of the Pierre Shale, these deposits form the surficial geology over much of the Denver Basin. In the project area, the allivium and eolian sediments form a thin veneer of wind-deposited silt and fine sand, or dunes. These sands vary in thickness from approximately 5 feet in the southeast part of the area of review to 60 feet in the northwest part of the area of review. At the site of the UWHGS 1-17D well, the alluvium is approximately 15 feet thick.

PIERRE SHALE (15' - 4300')

The Pierre Shale is a widespread silty, dense marine shale extending to a depth of 4,300 ft thick at this project site. The uppermost 400 feet of this formation is an olive-gray, clayey marine shale with thin discontinuous lenses of siltstone and very fined grained sandstone. These slightly permeable lenses subcrop the dune sand where the dipping beds are beveled by erosion and may be recharged by precipitation percolating through the dune sand. The thin siltstone and sandstone lenses of the upper Pierre may produce water yields of highly mineralized, soft water when in hydraulic contact with the dune sands.

COLORADO GROUP (4300' - 5060')

The Upper Cretaceous age Colorado Group lies in the interval between 4300 ft and 5060 feet below ground surface. This group consists of, in descending order, the Smokey Hill Chalk and the Fort Hayes Limestone members of the Niobrara Formation, the Carlisle Shale, the Greenhorn Limestone, and the Graneros Shale. These units consist of shale, siltstone and limestone.

DAKOTA GROUP (5060' - 5510')

The Cretaceous age Dakota Group lies in the interval between 5060 feet and 5510 feet below ground surface. This group consists of, in descending order, the upper "D" and "J" Sandstone members, the middle Skull Creek Shale member, and the basal Plainview-Lytle Sandstone member. It is a regional aquifer that underlies a large area of the western interior of the U.S. The total thickness ranges between 250 and 350 ft thick. The Dakota J Sandstone is the proposed water source for the solution mining operations and the proposed waste brine disposal injection zone.

MORRISON FORMATION (5510' - 5820')

The Morrison Formation consists of variegated shale and siltstone, with interbedded limestone and sandstone beds. The Morrison exists in the interval between 5910 feet and 5970 feet below ground. The Morrison has not been tested for water quality in the vicinity of the project, however, it has the potential to serve as a USDW within the project area.

LYKINS/CHUGWATER FORMATION (5820' - 5970')

The Triassic aged Lykins/Chugwater Formation are Triassic aged rocks overlying the Permian System. The Chugwater Formation is the equivalent of the upper Lykins Formation and consists of red to maroon or purple sandstone, siltstone, and shale. The unit ranges up to 250 feet thick in the basin where it has been less subjected to erosion. The Lykins/Chugwater has not been tested for water quality in the vicinity of the project, however, it has the potential to serve as a USDW within the project area

PERMIAN SERIES (5970' - 6380')

The Permian age rocks, at a depth of 5970 feet below ground surface are of particular interest because they contain the salt layers in which the gas storage caverns will be created by the solution mining wells. The Permian salt unit consists of interbedded halite, anhydrite and shale. The Permian salt unit is approximately 320 ft thick, and consists of an upper and lower salt layer that were deposited by evaporation of seawater in a restricted marine embayment, separated by a relatively thin shale. The top of the Permian salt unit is sealed by a 60 ft thick upper confining layer of Triassic age Chugwater Formation red shale, siltstone and anhydrite, and the bottom by an approximately 55 ft thick lower confining layer of Flowerpot Shale and Anhydrite. The Permian rocks total between approximately 900 to 1,200 ft thick in total thickness, and directly overlie Pennsylvanian age and older basement rocks.

BASEMENT (Below 6380')

Pennsylvanian age sandstone, carbonate and shale layers, between 800 ft to 1,700 ft thick unconformably overlie Mississippian age rocks, and these Pennsylvanian sediments in turn were covered up by Permian age carbonate, sandstone and evaporite rocks. Mississippian age limestone and dolomite were deposited on the crystalline Cambrian and Precambrian age basement rocks.

Proposed Injection Zone(s) (TABLE 2.2)

An injection zone is a geological formation, group of formations, or part of a formation that receives fluids through a well. The proposed injection zone is listed in TABLE 2.2.

Injection will occur into an injection zone that is separated from USDWs by confining zones which are free of known open faults or fractures within the Area of Review. This Table lists parameters specific to the UWHGS 1-17D well and provides approximate information for the additional disposal wells proposed to be drilled subsequent to permit issuance.

TABLE 2.2 INJECTION ZONE					
Formation Name	Top (ft)	Base (ft)	TDS (mg/l)	Fracture Gradient (psi/ft)	Exempted? *
Dakota J-4 Sandstone	5150	5330	10,000	0.733	N/A

* This item describes the status of any aquifer exemption applicable to this injection zone:

C - Currently Exempted
E - Previously Exempted
P - Proposed
N/A - Not Applicable

Confining Zone(s) (TABLE 2.3)

A confining zone is a geological formation, part of a formation, or a group of formations that limits fluid movement above the injection zone. The Graneros Shale serves as the confining zone above the Dakota injection formation and the Skull Creek serves to confine injection from formation below the Dakota. The confining zones are listed in TABLE 2.3.

TABLE 2.3 CONFINING ZONES			
Formation Name	Top (ft)	Base (ft)	Lithology
Graneros Shale	4975	5060	Shale
Skull Creek Shale	5330	5460	Shale

Underground Sources of Drinking Water (USDWs) (TABLE 2.4)

Aquifers or the portions thereof which contain less than 10,000 mg/l total dissolved solids (TDS) and are being or could in the future be used as a source of drinking water are considered to be USDWs. Although several formations in the project area have the potential to serve as USDWs, the applicant has provided water quality data for only two of the formations (the Alluvium and the upper Pierre). The remaining formations will be considered to be USDWs until water samples show otherwise. The USDWs in the area of this facility are identified in TABLE 2.4.

TABLE 2.4 UNDERGROUND SOURCES OF DRINKING WATER (USDW)			
Formation Name	Top (ft)	Base (ft)	TDS (mg/l)
Dune Sands/Alluvium	0	15	Indicated as < 10,000
Pierre Sand Lenses	15	400	1,200
Niobrara	4300	4630	Not provided, assumed < 10,000
Greenhorn Limestone	4730	4975	Not provided, assumed < 10,000
Morrison	5510	5820	Not provided, assumed < 10,000
Lykins/Chugwater	5820	5970	Not provided, assumed < 10,000

The water analysis provided with the permit application shows the Dakota formation to contain water with 10,000 mg/l TDS. This value precludes the Dakota from consideration as a USDW. However, the Colorado Oil and Gas Conservation Commission (COGCC) and Colorado Department of Public Health and the Environment (CDPHE) have expressed concerns that the Dakota formation may contain water with

less than 10,000 mg/l TDS. Long-term monitoring of the Dakota formation will be required as a permit condition and will require the operator to submit to the Director quarterly TDS analysis from the Dakota formation Water Supply Wells in Section 18. Review of this water quality information will be used to assess whether or not the Dakota formation is a USDW.

Quarterly water samples from these Dakota Water Supply Wells will be required for the first two years of Class V well operation. After that time, the operator may petition the Director to modify the frequency of Dakota water analysis. Results of past monitoring results will be used to determine whether that petition can be approved.

PART III. Well Construction, Logging, and Testing

Well Construction Requirements

The approved well completion plans are incorporated into the Permit as APPENDIX A and are binding on the Permittee. Modification of these approved plans is allowed under 40 CFR 144.52(a)(1) provided that approval is obtained from the Director prior to actual modification.

Casing and Cementing (TABLES 3.1 and 3.2)
The construction plan for the well or wells proposed for conversion to an injection well was evaluated and determined to be in conformance with standard practices and guidelines that ensure well injection does not result in the movement of fluids into USDWs. Well construction and conversion details for the well or wells are shown in TABLES 3.1 and 3.2.

Tubing and Packer
Injection shall take place only through tubing installed on a packer. The packer will be set no more than 100' above the uppermost perforated or open hole interval. The tubing and packer shall be designed to prevent injection fluid from coming into contact with the outermost casing and to provide for monitoring the well's mechanical integrity.

Tubing-Casing Annulus (TCA)
The TCA allows for pressure monitoring to assess the integrity of the casing, tubing and packer and allows for periodic pressure-testing for mechanical integrity and leak detection. The TCA will be filled with fresh water treated with a corrosion inhibitor or other fluid approved by the Director.

Injection Well Monitoring Devices
The Permittee shall install and maintain in good operating condition:

(a) Sampling taps conveniently located and isolated by shut-off valves, to enable collection of representative samples of the fluid in the injection tubing and in the tubing-casing annulus; and

(b) One-half (1/2) inch female iron pipe fitting, isolated by shut-off valves and located at the wellhead at a conveniently accessible location, for the attachment of a pressure gauge capable of monitoring pressures ranging from normal operating pressures up to the Maximum Allowable Injection Pressure specified in APPENDIX C:

(i) on the injection tubing; and
(ii)on the tubing-casing annulus (TCA); and

(c) Continuous recording devices located to monitor and record injection pressure, annulus pressure, flow rate, and volume

(d) An automated shut-off device set to shut-off the injection pump when or before the Maximum Allowable Injection Pressure specified in APPENDIX C is reached at the wellhead; and

(e) A cumulative volume recorder attached to the injection line.

All sampling and measurement taken for monitoring must be representative of the monitored activity.